

REMARKS

Claims 1, 8-9, 12, 19-20, 23, 28, and 30 have been amended. No claims have been added or cancelled. Therefore, claims 1-30 remain pending in the application. Reconsideration is respectfully requested in light of the following remarks.

Information Disclosure:

The Examiner requests any references known to qualify as prior art under 35 U.S.C. sections 102 or 103 with respect to the invention as defined by the independent and dependent claims. In response to this request, an Information Disclosure Statement is submitted herewith.

Claim Objections:

The Examiner objected to claim 30 due to several informalities. Specifically, the Examiner submits that it is unclear what is meant by “the one or more instructions” and that it is unclear what is meant by “means for storing do not store the exceptional instruction within the trace cache entry with the one or more instructions”. Claim 30 has been amended to overcome this objection. Specifically, claim 30 has been amended to recite “the means for storing store the exceptional instruction in a different trace cache entry than any non-exceptional instructions.”

Section 102(e) Rejection:

The Examiner rejected claim 30 under 35 U.S.C. § 102(e) as being anticipated by Miller et al. (U.S. Publication 2004/0193857) (hereinafter “Miller”). Applicants traverse this rejection for at least the following reasons.

Contrary to the Examiner’s assertion, Miller fails to teach *means for detecting an exceptional instruction within the group of instructions* and *wherein in response to said*

detecting, the means for storing store the exceptional instruction in a different trace cache entry than any non-exceptional instructions. The Examiner cites block 14 lines 28+ “storing only exceptions or corrections” as reading on this limitation. This passage in Miller describes exceptions or corrections “to the implied predictions arising from an order of instructions within the traces from trace cache 110,” such as in the case of a branch misprediction. That is, Miller describes storing an indication of a change in the order of execution of the instructions that are in trace cache 110. This has nothing to do with detecting an exceptional instruction within a group of instructions, as recited in Applicants’ claim 30. Furthermore, this passage and paragraph [0013] describe that these indications of whether or not a branch was taken are stored in Branch History Table (BHT) 130, not in trace cache 110, as the Examiner contends. Neither of these passages describes *detecting an exceptional instruction*, nor storing a detected exceptional instruction *in a different trace cache entry than any non-exceptional instructions*, as recited in claim 30.

Applicants remind the Examiner that anticipation requires the presence in a single prior art reference disclosure of each and every limitation of the claimed invention, arranged as in the claim. M.P.E.P 2131; *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 221 USPQ 481, 485 (Fed. Cir. 1984). The identical invention must be shown in as complete detail as is contained in the claims. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). As discussed above, Miller fails to disclose *means for detecting an exceptional instruction within the group of instructions and wherein in response to said detecting, the means for storing store the exceptional instruction in a different trace cache entry than any non-exceptional instructions*. Therefore, Miller cannot be said to anticipate claim 30.

For at least the reasons above, the rejection of claim 30 is not supported by the cited art and removal thereof is respectfully requested.

Applicants note that the Examiner’s remarks regarding the rejection of claim 30 include a paragraph referring to claim 7 and a reference to “KALAFATIS”. Applicants

further note that these remarks appear to have nothing to do with claim 7 of the present invention nor is it clear if the citations in these remarks correspond to the reference cited below regarding the rejection of Applicants' claims of the present invention under 35 U.S.C. § 103(a). As the Examiner has not indicated that claim 7 of the present invention is rejected under 35 U.S.C. § 102(e) as being anticipated by Miller, or by Kalafatis, Applicants assume these remarks were inadvertently included in this section of the Office Action.

Section 103(a) Rejection:

The Examiner rejected claims 30, 1-2, 6-10, 12-13, 17-21, 23-24, and 28 under 35 U.S.C. § 103(a) as being unpatentable over Kalafatis (U.S. Publication 2003/0023835) in view of Mann (U.S. Patent 6,167,536). Applicants traverse this rejection for at least the following reasons.

Regarding claim 30, the Examiner admits that Kalafatis does not specifically disclose means for detecting an exceptional instruction within the group of instructions and wherein in response to said detecting, the means for storing do not store the exceptional instruction within the trace cache entry with the one or more instruction. The Examiner relies instead on Mann to teach these limitations in the abstract and in column 3, lines 20-35. Mann is directed toward providing instruction trace information for external test and debug hardware and these passages (plus column 3, lines 11-20) describe that only instructions that disrupt the instruction flow and in which the target address is in some way data dependent are reported by placing an entry in the trace cache for transfer to external debug hardware. The information provided by the trace cache includes the target address of a trap, interrupt handler, or return instruction, addresses from procedure returns, task identifiers, and trace capture start/stop information. Mann also describes that in the case of many unconditional branches or sequential instructions, no entry is placed into the trace cache. **It is unclear which, if any, of these items or instructions the Examiner equates to the exceptional instructions of Applicants' claims.**

Moreover, nothing in the cited passages describes means for detecting an exceptional instruction, and nothing in these passages describes *wherein in response to said detecting, the means for storing store the exceptional instruction in a different trace cache entry than any non-exceptional instructions*, as recited in claim 30. In fact, Mann does not describe storing instructions in the trace cache at all. Instead, Mann describes information indicative of the order of instruction execution that is stored in the trace cache and also describes some cases in which no information is placed in the trace cache (see, e.g., column 6, lines 11-14, and the table of column 13.) Since neither Kalafatis or Mann teaches or suggests storing both exceptional and non-exceptional instructions in the trace cache, the combination of Kalafatis and Mann would not teach or suggest the system of claim 30, which comprises *means for detecting an exceptional instruction within the group of instructions; and wherein in response to said detecting, the means for storing store the exceptional instruction in a different trace cache entry than any non-exceptional instructions*.

Furthermore, the Examiner has not stated a proper motivation to combine the references. The Examiner asserts that it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate means for detecting an exceptional instruction within the group of instructions and wherein in response to said detecting, the means for storing do not store the exceptional instruction within the trace cache entry with the one or more instructions as taught by Mann into the system of Kalafatis for the advantage of eliminating unnecessary steps thereby increasing the system bandwidth (Mann, column 3, lines 20-35). However, this passage in Mann describes reducing the amount of information transferred from the trace cache to external debug hardware, for which there may be bandwidth limitations. **It has nothing to do with bandwidth involved in storing information in the trace cache, as the Examiner incorrectly implies.** Furthermore, the system of Kalafatis does not include transferring trace information to external debug hardware, nor does Kalafatis describe any bandwidth issues with the operation of its trace cache. Therefore, Kalafatis would not receive the

benefit described by the Examiner if fewer instructions were placed in its trace cache. The Examiner has thus failed to show sufficient motivation to combine the references.

To establish a *prima facie* obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974), MPEP 2143.03. Obviousness cannot be established by combining or modifying the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion or incentive to do so. *In re Bond*, 910 F. 2d 81, 834, 15 USPQ2d 1566, 1568 (Fed. Cir. 1990). As discussed above, the cited art does not teach or suggest all limitations of claim 30 and the Examiner has not shown proper motivation to combine the references. Therefore, the Examiner has failed to establish a *prima facie* case of obviousness regarding claim 30.

For at least the reasons above, the rejection of claim 30 is not supported by the cited art and removal thereof is respectfully requested. Independent claims 1, 12, and 23 recite limitations similar to those discussed above regarding claim 30 and so the arguments presented above apply with equal force to these claims, as well.

Regarding claim 6, contrary to the Examiner's assertion, Kalafatis in view of Mann fails to teach or suggest a dispatch unit configured to dispatch instructions received from the instruction cache; wherein the dispatch unit is configured to detect the exceptional instruction within a group of instructions received from the instruction cache and to provide an indication of the exceptional instruction to the trace generator, wherein the trace generator is configured to detect the exceptional instruction in response to the indication from the dispatch unit. The Examiner relies on Mann (column 3, lines 20-35) to teach these limitations. However, nothing in this passage describes a dispatch unit and the Examiner cites nothing in Mann corresponding to a dispatch unit. Therefore, nothing in this passage teaches or suggests a dispatch unit being configured to perform the operations recited in claim 6 (detect the exceptional instruction and provide an indication of the exceptional instruction to the trace generator). Furthermore, there is nothing in this passage that teaches or suggests Mann's trace generator (which the

Examiner interprets as elements 112 and 106 of FIG. 4) receiving an indication of an exceptional instruction from a dispatch unit and in response, detecting the exceptional instruction. As discussed above, it is not clear which items of information or instructions of Mann the Examiner equates with Applicants' exceptional instructions, and there is no mention of how or by what means such instructions are detected. Therefore, the combination of Kalafatis and Mann does not teach or suggest all the limitations of Applicants' claim 6.

For at least the reasons above, the rejection of claim 6 is not supported by the cited art and removal thereof is respectfully requested.

The Examiner rejected claim 17, which recites *dispatching instructions received from the instruction cache, wherein said detecting the exceptional instruction is performed during said dispatching*, on the same basis as claim 6. However, as discussed above, the Examiner's citation in Mann fails to disclose dispatching instructions or detecting the exceptional instruction as part of a dispatching operation. Therefore, the rejection of claim 17 is not supported by the cited art and removal thereof is respectfully requested.

Regarding claim 9, Kalafatis in view of Mann fails to teach or suggest *wherein the trace generator is configured to not store any other instructions with the exceptional instruction in the different trace cache entry*. The Examiner again cites Mann (column 3, lines 20-35) as teaching this limitation. However, as discussed above, it is unclear which, if any, of the items or instructions described therein the Examiner equates to the exceptional instructions of Applicants' claims, and in fact, Mann does not describe storing instructions in the trace cache at all. Furthermore, since neither Kalafatis nor Mann teaches or suggests storing both exceptional and non-exceptional instructions in the trace cache, there is nothing in these references that describes whether or not any other instructions may be stored in the same entry of the trace cache as an exceptional instruction. Thus, the combination of Kalafatis and Mann does not teach or suggest

wherein the trace generator is configured to not store any other instructions with the exceptional instruction in the different trace cache entry.

For at least the reasons above, the rejection of claim 9 is not supported by the cited art and removal thereof is respectfully requested. Claim 20 includes limitations similar to those discussed above regarding claim 9 and so the arguments presented apply with equal force to this claim as well.

Regarding claim 10, contrary to the Examiner's assertion, Kalafatis in view of Mann fails to teach or suggest *wherein the exceptional instruction is a non-re-executable instruction*. First, as discussed above, it is unclear which, if any, of the items or instructions described in Mann (column 3, lines 20-35) the Examiner equates to the exceptional instructions of Applicants claims. In addition, this passage does not describe anything about any of the instructions being *non-re-executable*, as recited in claim 10.

For at least the reasons above, the rejection of claim 10 is not supported by the cited art and removal thereof is respectfully requested. Claim 21 includes limitations similar to those discussed above regarding claim 10 and so the arguments presented apply with equal force to this claim as well.

Applicants also assert that numerous other ones of the dependent claims recite further distinctions over the cited art. However, since the rejection has been shown to be unsupported for the independent claims, a further discussion of the dependent claims is not necessary at this time.

Allowable Subject Matter:

The Examiner stated that claims 3-5, 11, 14-16, 22, 25-27 and 29 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening

claims. In light of the above remarks, Applicants assert that these claims are allowable as currently written.

CONCLUSION

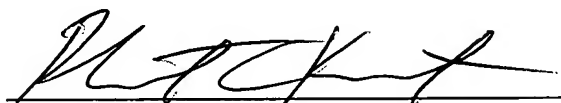
Applicants submit the application is in condition for allowance, and prompt notice to that effect is respectfully requested.

If any extension of time (under 37 C.F.R. § 1.136) is necessary to prevent the above-referenced application from becoming abandoned, Applicants hereby petition for such an extension. If any fees are due, the Commissioner is authorized to charge said fees to Meyertons, Hood, Kivlin, Kowert, & Goetzel, P.C. Deposit Account No. 501505/5500-88800/RCK.

Also enclosed herewith are the following items:

- ☒ Return Receipt Postcard
- ☐ Petition for Extension of Time
- ☐ Notice of Change of Address
- ☒ Information Disclosure Statement

Respectfully submitted,



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